
**SILVER BOW CREEK/BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT**

*Draft Final
Westside Soils Data Summary Report/Land
Improvements Report*

Columbia Basin L.L.C.

August 2014

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Draft Final Westside Soils Data Summary Report/Land Improvements Report

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Executive Summary

This Data Summary Report (DSR) summarizes the data collected during voluntary field investigation for solid media on 47 mining claim located north and northwest of Walkerville, MT in Westside Soils Operable Unit by Columbia Basin L.L.C. A total of four field investigations were conducted to characterize soils of the historic waste rock dumps on these claims. These field investigations were conducted in January 2010, October-November 2011, June 2014 and April-May 2015.

Eighty-five composite samples were collected during the sampling events. Typically, five separate soil sample locations were used to make up the composite sample. Sample locations were selected based on topography (waste rock dumps, glory holes, and native areas). Samples were analyzed for arsenic, cadmium, copper, lead, zinc, and pH. Sample results of all data collected during the investigation are summarized in Appendices A through D.

Statement of Authentication

The following data sets are considered to be final data generated or evaluated. Data have been designated as enforcement quality and screening quality as described in the Clark Fork River Superfund site investigations quality assurance project plan (QAPP) and data management/data validation (DM/DV) plan as supplemented by addendum. The signatories below hereby stipulate to the authenticity and accuracy of the data and hereby waive any evidentiary or other objection as to the authenticity and accuracy of reference in endangerment assessments, public health evaluations, feasibility studies, and RD/RA documents.

Approved by: _____

Columbia Basin L.L.C.

Date

Patrick J Sampson, Manager

Approved by: _____

EPA Remedial Project Manager

Date

Nikia Greene

U.S. Environmental Protection Agency

Region VIII

I. INTRODUCTION

Columbia Basin, LLC has entered into contract with the ARCO Environmental Remediation LLC (AERL) to perform sampling and/or reclamation (if required) of historic waste rock dumps west of Butte in exchange for title to AERL's interest in the affected properties. The purpose of this Butte Priority Soils Operable Unit (BPSOU) Westside Soils Data Summary Report is to provide the results of investigations conducted on approximately 47 mining claims performed during January 2010, October-November 2011, June 2014 (Background Samples), and April-May 2015. Sampling and analysis was performed by Columbia Basin, LLC in accordance with the BPSOU Sampling and Analysis Plan (SAP) (Atlantic Richfield Company 2005) and the USEPA, Region 8(EPA) provided oversight for these activities. Composite samples were taken on each significant and discrete waste rock dump on each claim with a waste rock dump. Minor surface disturbances such as test pits or shallow exploration trenches were evaluated on claims with no significant "Waste Rock Dumps". Background samples were requested by the EPA during field review of the Site and Draft Data Results Meeting conducted on May 30, 2014. This supplemental sampling was conducted on June 12, 2014. Copies of log book, the "Observations" map, and associated photographs are included in Appendix F, G and H.

II. OBJECTIVES

The overall sampling objective was to obtain data needed to define the extent of the waste rock dumps exceeding remediation action levels for "Open Space" specified in the BPSOU Record of Decision (ROD) September 2006. Specifically, characterization of surface samples from the waste rock dumps to provide information regarding levels of Contaminants of Concern (COCs), particularly arsenic and lead. The "Action" levels in soils from the ROD are listed in Table 1 below.

TABLE 1. Soil Remedial Action Levels

Action Levels	Arsenic	Lead
Residential	250	1200
Commercial	500	NA
Open Space	1000	2300

III. SITE DESCRIPTION

The site is located northwest of Butte, Montana, north of Oro Fino Road, west of Bull Run Road, and south of Storm View Road (see Figure 1, Overview) and includes the 47 mining claims listed below (26 - 100% AERL interest and 21 - Fractional AERL interest), which cover approximately 476 acres. Locations of these claims, as well as the locations of the waste rock dumps, glory holes, and other disturbances sampled are provided on Figures 1 - 3. Descriptions of the claims and samples collected are as follows:

- The Jesse S Claim (M.S. 8309) is a 100 percent ownership claim located in Section 1 of Township 3N, Range 8W and is 10.87 in size. One composite sample (8309-001) was collected from one large waste rock dump on this claim.
- The North Star Claim (M.S. 584) is a 100 percent AERL ownership claim located in Section 2 of Township 3N, Range 8W and is 14.63 acres in size. Three composite samples (584-001, 616-001, 616-002) were collected from three mine waste dumps and one background sample (584-BG03) from this claim.
- The Salisbury Claim (M.S. 616) is a 100 percent AERL ownership claim located in Section 2 of Township 3N, Range 8W and is 9.97 acres in size. Three composite samples (616-001, 616-002, 616-201) were collected on this claim from waste rock dumps.
- The Northern Butte Claim (M.S. 916) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 8.89 acres in size. Two composite samples (916-201, 916-301) were collected on this claim from waste rock dumps.
- The Springfield Claim (M.S. 745) is a fractional ownership claim in Section 1 of Township 3N, Range 8W and is 13.3 acres in size. Two composite samples (916-001, 916-002) were collected on this claim from waste rock dumps.
- The Blackstone Claim (M.S. 1213) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 13.97 acres in size. Two composite samples (1213-001, 1213-002) were collected from two waste rock dumps on this claim.
- The Night Hawk Claim (M.S. 1190) is a 100 percent AERL ownership claim located in Section 2 of Township 3N, Range 8W and is 14.62 acres in size. Three composite samples (1190-002, 1190-003, 1190-004) were collected from three mine waste dumps and one background sample (1190-BG01) from this claim.
- The Lamb Claim (M.S. 2347) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 0.72 acres in size. One composite sample (824-202) associated with this claim from the southern waste rock dump.
- The Little Cinnamon Bear Claim (M.S. 1848) is a fractional percent ownership claim located in Section 1 of Township 3N, Range 8W and is 0.99 acres in size. One composite sample (824-301) was collected from one waste rock dump on this claim.
- The Wabash Claim (M.S. 824) is a 100 percent AERL ownership claim located in Sections 1 and 2 of Township 3N, Range 8W and is 14.15 acres in size. Seven composite samples (824-001, 824-002, 824-003, 824-201, 824-202, 824-203) were collected from three waste rock dumps and one background sample (824-BG02) on this claim. Sample 824-002 had the highest As result (640 ppm) from

this area and the waste rock dump was regraded, covered with 6-8 inches of local cover soil and revegetated in 2011.

- The Gregory Claim (M.S. 1819) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 9.18 acres in size. Six composite samples (1818-003, 1819-001, 1819-002, 1819-003, 1819-004, and 1819-005) were collected from five waste rock dumps on this claim.
- The Washington Claim (M.S. 1818) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 16.36 acres in size. Two composite samples (1818-001, 1818-002) were collected from two waste rock dumps on this claim.
- The Florida Claim (M.S. 4069) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 2.07 acres in size. One composite sample (4069-001) was collected from glory hole material on this claim.
- The Elvina Claim (M.S. 1054) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 4.9 acres in size. One composite sample (1054-001) was collected from one waste rock dump on this claim.
- The Goodluck Claim (M.S. 2641) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 16.9 acres in size. Two composite samples (2641-001, 2641-002) were collected from two small waste rock dumps on this claim.
- The Ivanhoe Claim (M.S. 2843) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 6 acres in size. One composite sample (2843-001) was collected from one waste rock dump and one composite sample (2235-BG01) as background on this claim.
- The Big Bonanza Claim (M.S. 2235) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 15.46 acres in size. Six composite samples (2235-001, 2235-002, 2235-003, 2235-004, 2235-005, and 2235-006) were collected from six different waste rock dumps on this claim.
- The Little Eveline Claim (M.S. 2056) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 13.19 acres in size. One composite sample (2056-001) was collected from three small glory holes on this claim.
- The Old Buck Claim (M.S. 1963) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 17.83 acres in size. One composite sample (1963-BG02) was collected as back ground from this claim.

- The Cheyenne Claim (M.S. 3860) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 17.59 acres in size. One composite sample (3860-001) was collected from a small glory hole on this claim.
- The King Claim (M.S. 9301) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 0.68 acres in size. One composite sample (9301-001) was collected from a small glory hole on this claim.
- The Minnie Claim (M.S. 5115) is a 100 percent ownership claim located in Section 2 of Township 3N, Range 8W and is 11.04 acres in size. One composite sample (5115-001) was collected from two glory holes and a trench on this claim.
- The Oropheno Claim (M.S. 4105) is a 100 percent ownership claim located in Section 2 and 11 of Township 3N, Range 8W and is 7.23 acres in size. One composite sample (4105-001) was collected from a small glory hole on this claim.
- The Antone Claim (M.S. 10058) is a fractional ownership claim located in Section 11 of Township 3N, Range 8W and is 2.45 acres in size. One composite sample (10058-BG05) was collected as back ground from this claim.
- The Roaster Claim (M.S. 9583) is a fractional ownership claim located in Section 11 of Township 3N, Range 8W and is 11.49 acres in size. One composite sample (9583-001) was collected from a small glory hole on this claim.
- The Blackhawk Claim (M.S. 1145) is a fractional ownership claim located in Section 11 of Township 3N, Range 8W and is 17.83 acres in size. One composite sample (1145-001) was collected from a small glory hole on this claim.
- The Black Warrior Claim (M.S. 1302) is a fractional ownership claim located in Section 11 of Township 3N, Range 8W and is 14.82 acres in size. One composite sample (1302-001) was collected from a small glory hole on this claim.
- The Buckeye Claim (M.S. 6681) is a 100 percent ownership claim located in Section 10 and 11 of Township 3N, Range 8W and is 12.3 acres in size. One composite sample (6681-001) was collected from a small glory hole on this claim.
- The Golden King Claim (M.S. 1625) is a fractional ownership claim located in Section 11 of Township 3N, Range 8W and is 8.64 acres in size. One composite sample (1625-001) was collected from a small glory hole on this claim.
- The Shuttle Claim (M.S. 1658) is a fractional ownership claim located in Section 11 of Township 3N, Range 8W and is 9.33 acres in size. One composite sample (1658-BG04) was collected as background on this claim.
- The Harlekin Claim (M.S. 1346) is a 100 percent ownership claim located in Section 2 and 11 of Township 3N, Range 8W and is 11.06 acres in size. One

composite sample (1346-001) was collected from a small waste rock dump on this claim.

- The Houghton Claim (M.S. 1310) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 7.39 acres in size. One composite sample (1310-001) was collected from three small glory holes on this claim. Sample 1310-001 split had the highest Pb result (2082 ppm).
- The None Such Fraction Claim (M.S. 1544) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 9.32 acres in size. Three composite samples (1544-001, 002, 003) were collected from three large waste rock dumps and one composite sample (1544-BG03) as background on this claim.
- The None Such Claim (M.S. 624) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 16.36 acres in size. One composite sample (624-001) was collected from two small glory holes on this claim.
- The Credit Claim (M.S. 1192) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 14.23 acres in size. One composite sample (1192-001) was collected from two small glory holes on this claim.
- The Little Gorgey Curtis Claim (M.S. 1633) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 5.2 acres in size. One composite sample (1633-001) was collected from three small glory holes on this claim.
- The Hopewell Claim (M.S. 1763) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 4.9 acres in size. One composite sample (1763-001) was collected from one small glory hole on this claim.
- The Wake Up Mat Claim (M.S. 8928) is a fractional ownership claim located in Section 11 of Township 3N, Range 8W and is 3.83 acres in size. One composite sample (8928-001) was collected from three small glory holes on this claim.
- The Little Annie Claim (M.S. 1046) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 20.52 acres in size. Six composite samples (1046-001, 1046-002, 1046-003, 1046-004, 1046-005, 1046-006) were collected from six waste rock dumps on this claim.
- The Minnie Jr. Claim (M.S. 9308) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 0.98 acres in size. One composite sample (9308-001) was collected from one small glory hole on this claim.
- The Bryan Claim (M.S. 6593) is a fractional ownership claim located in Section 2 of Township 3N, Range 8W and is 3.48 acres in size. With no disturbed materials on this claim, one composite sample (6593-BG06) was collected as background.

- The Mill Side Claim (M.S. 1234) is a fractional ownership claim located in Section 2 and 11 of Township 3N, Range 8W and is 14.01 acres in size. One composite sample (1234-001) was collected from five small waste rock dumps on this claim.
- The Sooner Claim (M.S. 1642) is a fractional ownership claim located in Section 1 and 2 of Township 3N, Range 8W and is 8.34 acres in size. One composite sample (1642-001) was collected in the vegetative area on this claim with no disturbed materials.
- The Cobb Fraction Claim (M.S. 10562) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is .014 acres in size. Due to the size and un-located monuments on this claim, no sample was collected on the claim, the associated samples from the surrounding claims (Goldsmith, Sooner, Dixon) are assumed to be relevant to this claim also.
- The Goldsmith Claim (M.S. 981) is a 100 percent ownership claim located in Section 1,2, 11 and 12 of Township 3N, Range 8W and is 17.56 acres in size. Five composite samples (981-001, 002, 003, 004, 005) were collected from four large waste rock dumps and one from five small waste rock dumps on this claim.
- The Dixon Claim (M.S. 1614) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 7.76 acres in size. One composite sample (981- 005) associated with this claim in the northeast corner from five small waste rock dumps. Also one composite sample results (Ryan-SF-04) (See Figure 10) from structural fill excavation area for Atlantic Richfield's slope reduction project at the corner of Buffalo and Main Streets are also included.
- The Goldsmith No.2 Claim (M.S. 1136) is a 100 percent ownership claim located in Section 11 of Township 3N, Range 8W and is 12.11 acres in size. Three composite sample results (Ryan-SF-01, Ryan-SF-02, and Ryan-SF-03) (See Figure 10) from structural fill excavation area for Atlantic Richfield's slope reduction project at the corner of Buffalo and Main Streets are also included.

IV. SAMPLE ANALYSIS

Samples were analyzed for total arsenic, cadmium, copper, lead, and zinc using X-Ray Fluorescence (XRF) "Ex-situ" bagged methodology – bagged samples for more homogeneous samples generally making them more representative of the locations where the soil was collected. Sample collection and pH measurement was completed in accordance with the BPSOU SAP. Sampling was conducted during four periods in January 2010, October-November 2011, June 2014, and April-May 2015. All samples consisted of composites of five subsamples from 0" to 2" in depth and equal volume. Composite samples were placed in gallon-sized labeled zip-lock bags using ultra-clean disposable plastic scoops for homogenizing

to eliminate the need for field decontamination. Eighty five (85) composite samples were collected from the waste rock dumps, glory holes, test trenches and vegetated area, five (5) samples were submitted for laboratory analysis, eleven (11) duplicates, and two (2) replicates. Samples are named by Claim number followed by location (Claim # - 001). Sample results are provided in Appendix A. A labeled pin flag was placed at the center of the five point composite unless noted by a, b, and c, locations were recorded using a GARMIN GPSmap 60CSx unit and are shown on the Figures and Appendix C.

At the request of EPA, on June 12, 2014, six background composite samples were collected (three from the north area and three from the south area) from undisturbed areas up gradient of waste rock dumps. EPA provided oversight for this sampling activity. The sample locations were chosen by EPA in the field and are shown on the Figures with locations recorded with the GPS. The background samples are labeled by Claim number followed by BG- location (Claim #- BG01). These samples were to be analyzed according to the Butte Soils Screening Study (April 1988), the table below compares the XRF detectable metals and the screening study metals reported. The green highlights match the screening study, red highlights are metals not detected by the XRF and the yellow highlights indicate additional metals detected and reported in Appendix B of this report. This deviation was agreed upon with the EPA via email communication (June 16, 2014).

List of metals detectable by Pioneer's Niton XRF Analyzer, Model XLp 722				Butte Soils Screening Study April 1988			
Cadmium source			Americium source				
As			Ag		Al	Aluminum	
Co			Ba		At	Antimony	
Cr			Cd		As	Arsenic	
Cu			Cs		Ba	Barium	
Fe			La		Be	Beryllium	
Hg			Pd		Cd	Cadmium	
Mn			Sb		Ca	Calcium	
Mo			Sn		Cr	Chromium	
Ni			Te		Co	Colcalt	
Pb					Cu	Copper	
Rb					Fe	Iron	
Se					Pb	Lead	
Sr					Mg	Magnesium	
Zn					Mn	Manganese	
Zr					Hg	Mercury	
					Ni	Nickle	
3/21/2013					K	Potassium	
					Se	Selenium	
					Ag	Silver	
					Na	Sodium	
					Ti	Thallium	
					Sn	Tin	
					V	Vanadium	
					Zn	Zinc	

Additionally, during an April 6, 2015 project meeting, Atlantic Richfield requested that a minimum of one composite sample from each claim regardless of mining disturbed soils or not

and that the remaining claims with waste rock dumps be completed. This request resulted in the supplemental sampling that was performed April - May, 2015 to assess all previously unsampled claims.

V. QUALITY ASSURANCE

Sample duplicates and standards were analyzed in accordance with the CFROU/BSPOU protocols. Five (5) confirmatory samples were submitted for laboratory analysis as required by US EPA Method 6200. Eleven (11) field duplicate and two (2) replicate samples were analyzed to examine combined variability due to roughly homogenized samples, sampling techniques, and inherent field variability. Results of these analyses including relative percent difference (RPD) values and Level A/B Screening Checklist are presented in Appendix D. All samples have been retained and archived for reference.

High RPD values may occur because of difficulty associated with complete homogenization of samples in the field. Low concentrations can also lead to higher RPD values because a low concentration requires a much smaller concentration difference between an original and duplicate sample than higher concentrations to produce the same RPD. Due to these reasons and the lack of formal review criteria for field duplicates, no qualifiers were placed on the data based on field duplicate results.

In addition, five Standard Reference Material (SRM) samples were prepared and analyzed using the National Institute of Standards and Technology (NIST) SRM # 2710. Percent recoveries for the SRM are presented in Appendix D.

VI. RESULTS

A total of eighty-five (85) samples were collected in the field from a total of 46 claims and ninety-eight (98) samples analyzed in this sampling efforts with five (5) samples submitted for laboratory analysis, eleven (11) duplicates, and two (2) replicates. Based on the BPSOU "Open Space" action levels, data results estimates no samples exceeded and therefore no remedial actions are anticipated. An observation of the potential mobilization of the COCs from the soils to surface water and/or groundwater does not appear to be a significant risk. Characterization indicates that the low COC concentrations from Waste Rock dumps are similar to "background", depth to groundwater is approximately 100 feet below surface, and intermittent surface water from this area is approximately 4 miles from waters of the state. Also included in this DSR is the Butte Silver Bow (BSB) Residential Metals Abatement Program (RMAP) sampling location map from 22 properties in this area which also had no sample analysis results exceeding "Residential" action levels in this area (see Figure 12).

VII. SAMPLING AND ANALYSIS PLAN DEVEATIONS

Sampling and analysis technical procedures were followed with the following deviations:

- Samples were collected directly from 0 to 2 inch depths by scraping the sidewall with an ultra-clean disposable scoop and placed into food grade quart size zip-lock bag.
- Samples were homogenized in gallon zip-lock then transferred back to the original zip-lock bag to eliminate decontamination of stainless steel bowls and spoons.
- Each sample consisted of five subsamples as used by Residential Metals Abatement Program and during the Railroad Bed Time Critical Removal Action.
- Waste rock dump polygons were delineated visually utilizing 2009 google earth aerial photography and then field verified with the Agency Representatives (Sara Sparks, Nikia Greene) during sampling events.
- Three samples were added to “Background” to meet Atlantic Richfield’s requirement of at a minimum one sample from each claim even if there were no mine disturbance.
- Soil Methodology with Handheld XRF

The first remedial step in treating these hazardous areas is in accurately assessing the scope and extent of the contaminated soil. Thermo Scientific Niton XRF analyzers provide lab-grade performance in the field, permitting surgical delineation of contamination boundaries, while in full compliance with US EPA Method 6200.

Soil testing methods: In-situ screening – trend analysis or quickly delineating the boundaries of contamination

Ex-situ analysis – bagged or prepared samples for more homogeneous samples

Ex-Situ Soil Analysis

Thermo Scientific Niton XRF analyzers are the ideal tools to test bagged or prepared soil samples. Measuring bagged samples roughly homogenizes the samples, generally making them more representative of the locations where the soil was collected. For true lab-grade analytical data, full sample preparation (dried, ground, sifted, and cupped) is necessary, frequently resulting in correlations with lab data with $r^2 \geq 0.98$.

VIII. LAND IMPROVEMENTS

The terms of the agreement between AERL and Columbia Basin LLC specified that certain land improvement activities be performed if it was determined that CoC concentrations exceeded open space action levels previously discussed. Even though all waste rock dumps sampled are below BPSOU “Open Space” action levels, land improvements were implemented by Columbia Basin on nineteen waste rock dumps to date as shown on Figures 4 – 9, as a demonstration of

their commitment to good stewardship to the land. The improvements consisted of fencing to manage grazing intensity, controlling weeds, consolidating and re-grading waste rock dumps to a maximum slope of 3 to 1, covering the regarded dumps with 6 inches of local growth media, and mulching/seeding to promote vegetation. The Improvements Summary Report is provided in Appendix E.

To date, approximately 18,000 feet of four strand barb-wire fence has been constructed around the perimeter of adjoining claims and, when applicable, connecting to a well maintained existing fence.

Pursuant to local ordinance, weed control was performed on four hundred and seventy five (475) acres by inspecting and spot spraying as needed on an annual basis to mitigate noxious weed species in the area. This practice will continue as needed to remain in compliance with the ordinance.

Approximately 14.4 acres were re-graded to consolidate waste rock and promote vegetation growth. Historically, waste rock dumps were constructed by dump material at the angle of repose (approximately 1 ½ to 1) down gradient of the shaft location. As part of the effort, material was pulled up the slope and consolidated to reduce the footprint of the material deposition area. In cases of surface subsidence (suspected shafts) near the waste rock dump, dump materials were used to fill the subsidence. These areas are depicted on Figure 1 and 2 as Claim Number-Shaft (e.g., “924-Shaft”). When appropriate, the re-graded slopes were tracked with equipment to consolidate the materials. Waste rock material comprised of 4-inch plus rock content greater than 80 percent did not require compaction. Existing trees (Aspen, Pine, and Spruce) on and around the waste rock dumps were preserved to the maximum extent practicable.

After regrading was completed, soil pH was measured. Based on these results, six waste rock dumps on the North Star M.S. 584, Wabash M.S. 824, and Big Bonanza M.S. 2235 received lime application (approximately 1,000 cubic yards) to raise the pH prior to covering with the growth media.

Approximately 9,500 cubic yards of local borrow were utilized for growth media, which was applied at approximately 6 inch depth to nineteen (19) waste rock dumps. Borrow was taken from low lying areas (see Figure 11) where material depths greater than six inches were found. All borrow areas were stripped of the original seed bed and that material was then replaced and reseeded after suitable material was exhausted. The seedbed was prepared by dozer tracking the slope. The areas were broad cast seeded at the rate of approximately 30 pounds per acre. The areas were then straw mulched and dozer-tracked to crimp straw and bed the seeds into the soil.

The deeds for the claims upon which improvements have been implemented will be recorded with “Deed Restrictions” in order to prevent inappropriate use of the subsidence areas and waste rock dumps, and to preserve the improvements.

Appendix A

SAMPLE RESULTS

Appendix B

BACKGROUND SAMPLE RESULTS

Appendix C.

GPS COORIDINATES

Appendix D.

QUALITY ASSURANCE

Appendix E
Land Improvements Summary

Appendix F, G, and H

CD - FIELD LOG BOOK, FIELD MAP, PHOTOS

FIGURES